

REMARKS

Claims 1-14 are pending in the application, of which, claims 5, 6, 13 and 14 have been withdrawn from consideration. Claims 1-4 and 7-12 stand rejected. Claims 1, 4 and 11 have been amended. In view of the amendments to the claims and the remarks below, Applicants respectfully request that the rejections be withdrawn and the claims be allowed.

Claims 1-4 and 7-12 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. Specifically, claims 1 and 4 are alleged to contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

In response to the rejection, claim 1 has been amended to no longer recite the limitation to which the rejection was directed. Specifically, claim 1 no longer recites “a frequency in the range of 20 GHz to 100 THz.” Therefore, claim 1 is allowable.

Claim 4 has been amended to recite the frequency range originally presented in claim 4. Therefore, claim 4 is also allowable on its own merits and for at least the same reasons that claim 1, from which claim 4 depends, is allowable. Claims 2, 3 and 7-12 depend from claim 1 and are allowable for at least the same reasons that claim 1 is allowable.

Accordingly, Claims 1-4 and 7-12 are allowable. Applicants respectfully request that the rejections be withdrawn and that the claims be allowed.

Claim 4 stands objected to under 35 C.F.R. § 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim.

As explained above, both claims 1 and 4 have been amended. Claim 1 no longer recites a frequency range, and the frequency range recited in claim 4 now acts to further limit claim 1. Accordingly, claim 1 is allowable and Applicants respectfully request that the objection be withdrawn.

Claims 1-4 and 7-12 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,560,259 to Hwang ("Hwang"). The rejection is traversed.

Claim 1 recites a laser comprising a substrate that includes a bulk region and a conducting layer. The laser also includes an active region that comprises "a quantum cascade structure provided on a first surface of the substrate such that said active region is electrically connected to said conducting layer." The active region is electrically connected to said conducting layer via first and second contacts, "said first and second contacts being disposed on opposite sides of said active region." The laser also includes "an active region contact provided to said active region such that a potential may be applied between said active region contact and said first and second contacts to cause said active region to lase." The active region contact is "a metal contact provided overlying said active region." "[E]mission from said laser is collected from the edge of said active region." This is illustrated in figure 3 of the present application, which illustrates a laser according to claim 1. In figure 3, a top contact 31 or active region contact is formed on the upper surface of the active region 11. Application, ¶ [0073]. The resulting laser, therefore, must be of an edge-emitting type and not of a surface-emitting type. A person of skill in the art would also understand from paragraph [0078] of the application that the formation of cleaved facets indicates that the recited laser is of the edge-emitting type. As explained below, Hwang does not disclose these limitations.

Hwang relates to a surface-emitting laser. Hwang, Abstract. Hwang does not disclose an edge-emitting laser with the recited active region contact that is a "metal contact provided overlying said active region." *See* Hwang, fig. 1. The use of an edge-emitting laser with the novel contact arrangement, as recited in claim 1, allows for a lower series resistance and thus is advantageously used for generating continuous wavelength ("CW") terahertz frequencies. On the other hand, generation of CW terahertz frequencies using a surface-emitting laser, such as in Hwang, is hampered because the use of thicker active layers (required to generate terahertz frequencies) creates an increased series resistance in a surface-emitting laser. Thus, a person of ordinary skill in the art would not look to surface-emitting lasers when improving edge-emitting lasers.

Accordingly, Hwang fails to anticipate claim 1. Claim 1 is thus allowable over Hwang. Claims 2-4 and 7-12 depend from claim 1 and are allowable for at least the same reasons that claim 1 is allowable. Applicants respectfully request that the rejections be withdrawn and that the claims be allowed.

In view of the above amendment, Applicants believe the pending application is in condition for allowance. If there are any additional charges in connection with this filing or any subsequent filings (including but not limited to issue fees), the Examiner is respectfully requested and authorized to charge Deposit Account No. 04-1073 therefor under Order No. M0025.0325/P325.

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